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AUTHOR Jacobs, James; Teahen, Roberta C.
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ABSTRACT

Beginning in 1995, the Michigan Department of Education sponsored pilot projects at the state's community colleges to develop curricular learning models and/or courses that integrate liberal arts or general education into vocational programs, identify and document faculty collaboration between liberal arts and occupational programs, and determine barriers interfering with the integration process. Throughout 1995, workshops and seminars were held with project teams and by fall 1995 at least four colleges had completed pilot projects. Delta College developed a nursing project integrating an introduction to health care, a health care ethics, and a writing class into a learning community model. At Henry Ford Community College, a technical physics course was developed that frames course modules within industrial situations. Macomb County Community College implemented a business and technical writing course designed by faculty from the English, Technology, and Accounting Departments, while at Northwestern Michigan College, a multidisciplinary course was developed focusing on the necessary skills for entry-level workers in high-performance manufacturing organizations. Common themes arising from the projects included the use of innovative pedagogical approaches, the lack of articulation between the new models and existing high school and college curricula, a focus on communication skills, the existence of clear target audiences for each project, the need to overcome existing institutional climates resistant to change, and the importance placed on assessment. A directory of participants is appended. (HAA)

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We're Doing It: Michigan Models for Academic and Occupational Integration

A Roundtable Discussion at the
League for Innovation's Workforce 2000 Conference
Orlando, Florida

February 2, 1996

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Facilitated by:

Dr. James Jacobs
Associate Vice President for Community and Business Services
Macomb County Community College
Warren, Michigan 48093-3896

Roberta C. Teahen
Director of Business and Workforce Development
Northwestern Michigan College
Traverse City, MI 49686

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Let's Stop Talking About It and Just Do It!

Introduction

The issue of integration has emerged because of:

1. Changes in the workplace and employer needs
2. Changes in schools, with the need to teach more "learning to learn" versus learning content, which becomes obsolescent at an accelerating pace
3. Changes in how we view schools - especially community colleges - as learning organizations.
4. National initiatives in Tech Prep and School-to-Work

The benefits of integration of content for students, employers, faculty, and administrators are well documented in the national literature. Summaries of this research are included in the comprehensive report of the Michigan Models Project.

A Michigan Approach

"Let's stop talking about it and do it!" was the challenge in October of 1994. And by the fall of 1995, at least four Michigan community college teams of faculty had done it! The "it" was the integration of academic and occupational content - the goals and strategies for which would be jointly developed by faculty from different disciplines in traditionally academic and career specialty areas.

Description of the Michigan State-Wide Project

The state-wide initiative came as a result of a challenge issued by Dr. James Jacobs as an outgrowth of a lively discussion at the annual Trends in Occupational Studies Conference in Grand Rapids, Michigan, in October. "General Education and the Technical Student: Is There a Common Ground?" was the title of a session presented by Barry Alford, English instructor at Mid-Michigan College; Richard Doctor, Muskegon Community College; and Barbara Taraskiewicz, Kalamazoo Valley Community College. The description was:

> *The integration of academic and technical programs continues--is there a foundation of academic "skills:" we can agree on? Further, how would we recognize that those skills have been learned/mastered?*

Trends attendees are primarily occupational faculty and administrators. The question-and-answer session evolved into a challenge of whether the assumptions were valid - whether it was accurate to conclude that general education courses necessarily contribute to the development of critical thinking, communications, and teamwork skills. In follow-up conversations, the statement was made that many occupational courses could also accomplish the goals we share for our students. The presenters invited Dr. James Jacobs and Roberta Teahen, of Macomb and Northwestern, respectively, to posit their perspective as presenters at their annual conference the next February, LAND (Liberal Arts Network for Development).

Jim Folkening of the Michigan Department of Education agreed to fund a pilot project in

Michigan. At the February 1995 meeting, the presenters were not only able to explain why they think there are alternative methods for achieving our shared goals - and that the very limited research which exists may corroborate our hypothesis - but that we were eager to work toward continuing to assure that the goals are accomplished - through the joint development of appropriate content and strategies.

An additional challenge was not only would we participate in instructional design training and jointly develop courses that accomplished our shared objectives, but we would do so before the next meeting of Trends in early October - so that we could report back to our colleagues that we had stopped talking and had started doing.

By April the details of the project had been finalized, and dates were set for an in-service session in Traverse City in July. The project would be called "Curriculum Development: Integration of Liberal Arts and Occupational Education." Consultants from the Wisconsin Instructional Design System (WIDS) were invited to conduct a two-day seminar with faculty and administrative teams who attended.

The purposes of the pilots are:

1. To develop curricular learning models and/or courses which integrate liberal arts and general education in occupational programs.
2. To identify and document the collaborative process of work between liberal arts and occupational faculty which results in formulating the new model.
3. To document and illuminate the barriers which interfere with the integration process at a team level.

At their July 1995 session, teams were asked to present their projects, including the following points:

1. Describe the team project. Include the courses involved.
2. What are the objectives of the model?
3. What learning outcomes are sought by the model?
4. What strategies are anticipated to reach the learning outcomes?
5. Describe the working relationships between the faculty team. Team meetings: frequency, length, and productivity?
6. What time lines are anticipated for completion of the team project?

National Perspectives on Community Colleges' Curricular Integration

The work most directly related to our endeavor was reported in Norton Grubb's NCRVE research report entitled "A Time to Every Purpose: Integrating Occupational and Academic Education in Community Colleges and Technical Institutes." (1992) Grubb describes the eight community college approaches to integration.

1. General Education Requirements
2. Applied Academic Courses

3. Cross-Curricular Efforts: Incorporating Academic Skills in Occupational Programs
4. Incorporating Academic Modules in Expanded Occupational Courses
5. Multidisciplinary Courses Combining Academic Perspectives and Occupational Concerns
6. Tandem and Cluster Courses and Learning Communities
7. Colleges-Within-Colleges
8. Remediation and English as a Second Language (ESL) Programs with an Occupational Focus

At a June 1995 workshop in Beaver Creek, Colorado, attended by project coordinator James Jacobs, "Integrated Learning: The School-to-Work Connection," Norena N. Badway presented on "Models of Integrating the Community College," based extensively on the research from the National Center for Research in Vocational Education. She shared a continuum with four major blocks: General Education, Combining Content in Individual Courses; Multidisciplinary; and Clusters of Courses.

The successful models rely heavily upon collaboration and they move away from the isolated course as the basic unit of postsecondary institutions. Both top-down and bottom-up efforts are required to assure that the innovation is sustained.

It is said that integration is less about what is taught than how it is taught. It is outcome driven. It is performance based. It builds on connections . . . in a context that matters or challenges or excites. In "Meeting the Mandate: Renewing the College and Departmental Curriculum," William Toombs and William Tierney write:

> *"In the fullest sense, the curriculum is intended to serve all students by means of an experience that has enough unity to sustain a common discourse among the best trained and education. If students are to be in tune with a world few of their mentors have known, the course of study will have to be changed in fundamental ways still to be determined, discovered, or made. . .*
>
> *Analysis of the curriculum, for whatever purpose, at whatever level, is a critical feature of the practice situation in the academic profession. . . Changes in the curriculum to meet contemporary challenges are made in one of three ways: (1) modification or reform, the most familiar; (2) integration, perhaps the most difficult; and (3) transformation, a type of change that responds to complexity and uncertainty."*

Benefits of Curriculum Integration

As more experience is gained in community colleges, the benefit can be more confidently identified, but preliminary findings are that the integration of curriculum will/does yield the following benefits:

- Better meeting the needs of occupational students
- Better educational preparation of transfer students
- Increased mastery of fundamental competencies important for education and work

success

- Increased student motivation in academic and developmental courses
- Superiority of contextual instruction
- Incorporation of moral, humanistic, and political perspectives into occupational programs--the general education purpose
- Incorporation of career awareness and employment skills into liberal arts and sciences courses--the occupational education purpose
- Bridging the independent "islands" of the community college
- Re-energizing the faculty
- Encouragement of innovation and entrepreneurism
- More student-centered curricula
- Improved preparation of students for work
- Enhanced collaboration and teamwork among faculty
- Improved respect among faculty and administrative colleagues
- Development of a community of learners
- Increased retention of students
- Improved grades of students
- Changed teaching practices
- Better career choices
- Scheduling flexibility
- More interaction around teaching and learning issues
- Interdisciplinary cooperation
- Industry partnerships

Barriers to Curricular Integration

The barriers list is nearly as long and very challenging. Identified in the literature and from discussion of the Michigan faculty teams are the following constraints:

- Universities' acceptance of transfer credit for "new" courses
- Acceptance of competency-based exams or performances
- Reluctance of faculty to change
- Lack of expertise in nontraditional instruction
- Lack of expertise of individual faculty members in disciplines other than their own
- Pervasive disciplinary specialization
- Perceptions of status differences between academic and occupational faculty
- Lack of leadership in support of curriculum reform
- Lack of resources for release time, planning, purchased materials, and professional development
- The development of the community college as "an archipelago of independent divisions, each serving an independent mission" (Grubb)
- Lack of institutionalization of integration
- Lack of support from administrators
- Lack of support from faculty peers - for many reasons, including a fear that if this form of instruction catches on, students will be attracted away from their classes

- Breaks from tradition; in many instances an established course has little chance to be significantly modified
- Innovation is not a part of the culture

Delta College
University Center, Michigan
"The Three Rites - wRrites - Rights of Nursing"

The Delta Bio-Ethics - Nursing 100 project was designed as a Learning Community, where students participated in all three of the courses.

Delta College's team:

- Identified the content for each of three courses: Nur 100 - Introduction to Health Care; PHL 215 - Health Care Ethics; ENG 111 - College Composition I
- Includes a nursing faculty member, Dorothy Eldridge Balish; English instructor Mary Beth Looby; and philosophy instructor Linda Plackowski. Dr. Betty Jones and John Flattery are the administrative liaisons.
- Identified core abilities and general education competencies which will be integrated and infused across all three courses
- Identified common themes for linking and learning activities which will be shared in all three courses.
- Requires students to enroll in all three classes of the community, for a total of 8 hours.

Delta faculty and administrative leaders have made a significant investment in the development of learning communities as a curricular alternative and model for integration. The College has a Learning Communities Advisory Board which promotes and coaches faculty development teams, and offers 4-6 learning communities each year. The Advisory Board is conducting research to evaluate learning effectiveness and efficiency. While the initial costs of team teaching and extra development may appear to be high, preliminary research from the Delta experience suggests that learning communities may have decided advantages over "stand alone" classes in terms of increased student retention, integrated content, and student achievement. Delta College was the site of a successful state-wide Conference on Learning Communities which featured authors Alfie Kohn and Patrick Hill, along with other Michigan and national leaders in learning research.

The core abilities for the pilot course include:

- Work collaboratively
- Communicate effectively
- Think critically and ethically
- Appreciate the impact of historical and contextual events on current events

Delta staff talk enthusiastically about the value of faculty teamwork. It's not about courses. . . . it's about modeling teamwork. They found it exciting to team up with faculty in content areas, but they acknowledge that the strategy requires a lot of joint planning time. They have come to describe part of what happens as "unprotected teaching." What the instructor does in the classroom is subject to total review of peers - an unusual occurrence in the higher education community. Their course will be presented for the first time in the fall of 1996.

Henry Ford Community College
Dearborn, Michigan
"NSF Technical Physics Project"

Technical Physics at Henry Ford meets two days a week for 125 minutes each period. Modules establish daily objectives, timelines, and guidelines for the class activities. Frequent opportunities for discussion and inquiry are an important component of the discovery method pedagogy employed. Two distinctive course features are that (1) Each module describes and is framed within an industrial situation. The case method is employed in this approach. (2) The course makes use of microcomputer-based labs that involve students in activities like those encountered by technicians in the workplace.

Examples of the objectives from the Kinematics module include the following:

- Recognize the graphs of a moving object with an initial velocity.
- Understand the relationship between distance, velocity, and acceleration.
- Relate the graphs to the following equation of motion (include exact equations)
- Calculate the distance traveled by an object using the velocity-time graph
- Record and analyze the motion of a trunk lid

Materials for the module include a computer, motion detector, track, cart, and an automobile.

English instructor Richard Bailey commented that they want students to speak in fluent memorandums when they leave, because that's the major form of communication in the workplace. They ask students to write about "what did they know they knew, what did they sort of know, and what did they absolutely not understand." The team uses this technique not only as an evaluation of students' learning but for feedback on the instruction.

> *Students have to work a period of time with some mystery. Students want it to be clean, but work is messy, so the classroom is a model of reality. They are also learning to work with each other: teamwork. They make use of each others' comments. Teams are pretty independent now.*

Teamwork among students is an important dimension in lab exercises, but students' performance is graded on an individual basis. An Industrial Advisory Board helped to create the course and provided real-world contexts for the modules. The manual will be produced in both paper and disk versions.

The physics instructor commented that he would now feel comfortable to do the teaching alone, because he has learned where the writing opportunities are and how to structure the learning activities. Team members Richard Bailey, English; Stanley Briggs, Electronics; and Robert Eschelman, Physics, have been at the development of their course for a longer period because they were successful in acquiring a National Science Foundation (NSF) Advanced Technological Education Program grant for development of their course which has provided them with extra resources, including the assistance of consultants on instructional design.

Macomb County Community College
Warren, Michigan
"Softening the Hard Line: Business and Technology Help Shape
an Interdisciplinary Writing Course."

Writing in Context: Business and Technical, is the focus of this project. Team members are Les Beecher, English; Brian Hamilton from Technology; and Fred Jex of Accounting.

Core abilities identified for the COR292 course are:

1. Communicate effectively, in writing and orally, to a variety of audiences.
2. Demonstrate an understanding of the relationship among the disciplines of English, technology, and business.
3. Acquire and apply collaborative skills to achieve goals.
4. Acquire and apply critical thinking skills to solve problems.
5. Anticipate and respond to change in a balanced and productive way.

COR 292 includes English 118, Technology 292, and Business 292. The class meets for five hours each week; in its first offering, it was scheduled from 5-9:30 p.m. The five credits are determined from the core English course of 4 and adding ½ credit each of Business and Technical credits. Fall enrollees are all males employed full-time in the automotive industry and working 40-60 hours per week and enrolled for this and another technology course. Many are involved with Chrysler's V-6 Flex Line, which became the basis for the major project: an eight-part report on the V-6 Flex Line. Students also make formal oral presentations on their work.

One example of a writing assignment for Part Seven: Cost Analysis is to use "Cause-and-Effect Analysis" to analyze the probable effect(s) on company profits as a result of replacing the old line with the new V-6 line. An essay of 500-750 words is requested.

Examples of the text materials provide valuable insights to the perspectives shared in the class, as assigned books include Lynn Troyka's Handbook for Writers; Robert Lacey's Ford: The Man and the Machine; and Tim O'Brien's The Things They Carried.

Northwestern Michigan College
Traverse City, Michigan
$I f Q = E^3$

The project title evolved from the finding early in the team's work that the essential skills for manufacturing employment, as validated by hundreds of U.S. companies, were also the skills important for work in engineering, science, business, commercial art, and other industries. They would also be important for education success. What began as a specialized course to meet the national skills standards for advanced manufacturing evolved into a "virtual course" that the team expects to be well suited for a comprehensive development of essential skills: thus, the title: Integrate for Quality Equals the Essentials for Education and Employment ($I f Q = E^3$).

Designed around a case-study approach utilizing a U.S. company, Harley-Davidson, the skills identified for entry-level workers in high-performance manufacturing organizations were the content. Topic areas include:

- Communication and Teamwork
- Math and Measurement
- Workplace Safety and Health
- Problem Solving
- Quality Assurance
- Blueprint Reading
- Manufacturing Fundamentals
- Business Planning and Operation
- Computer Use
- Product and Process Control
- Workforce Issues
- Workplace Skills
- Learning Skills

The project is designed to address both local and national demand for more highly skilled employees with a multidisciplinary, integrated learning program using case studies based on real-world, worksite situations. A just-in-time approach is envisioned, as particular needs are identified for target audiences.

Identified core abilities are:

- Communicate clearly and accurately
- Think creatively and critically
- Use problem-solving skills
- Analyze and manipulate quantitative relationships
- Create a quality product and value quality processes
- Work as a member of a team; collaborate successfully
- Apply appropriate technology

The team includes Stephen Drake, Mathematics; John Pahl, English; John Pflughoeft, Math and Engineering; Jill Hinds, Visual Communications/Commercial Art; Stan Sidor, Industry Training; Roberta Teahen, Business. The NMC course will be tested beginning in March 1996 with employees of the Dura Mechanical Components Division of Hidden Creek Industries as a part of that company's commitment to team training.

Common Themes in the Michigan Experience

While the projects and approaches were different, the process of integration has had many common themes.

- **Innovation** - Each project started with at least one internal champion and then at least some support and encouragement existed to develop the concept. The question for the future: How do we move from here to institutionalization? Should we? Most recognize that community colleges will be threatened if they fail to innovate, because others will.

- **Pedagogy** - Teaching took on new meaning: self-discovery, learning, facilitating, coaching, and other descriptors describe the student **and** teacher roles. None had ever experienced a class like they were creating.

- **Disconnect** - The relationship of these new hybrids to regional high school curricula, to other offerings in the community colleges, and especially in recognition in transfer to universities is not developed and potentially problematic. These models are richer than many "applied" courses, but how will they be acknowledged?

- **Communications Skills** - The integration of writing, speaking, listening were central to each of the projects, demonstrating the extent to which communication skills cut across all disciplines.

- **Target Audiences** - There was a clear target for each project - individual students in a particular program of study, often more mature, and often bringing other experience to the learning setting. The market was specifically identified and the content and delivery customized.

- **Climate/Culture** - These efforts persisted in environments where many question the validity; faculty involved often received little peer support or encouragement. The most progress was made in the institutions which provided extensive support for the efforts through professional development, grants, technology, and more.

- **Assessment** - All recognized the importance for valid and reliable assessment, but all are still struggling with this challenge. A great need exists for careful documentation, and the development will be timely with increased expectations from accrediting agencies and others.

- **Outcomes Consistency** - Although the four projects are designed to serve different audiences, the consistency among the core abilities is stunning. Whether in nursing, manufacturing, automotive assembly, or physics testing, the goals of collaboration, communication, thinking, and understanding prevail.

The Faculty Experience

What was learned by each team was somewhat different, but there were some common themes. The following represent the experience of at least one team or more than one team's members:

- As learning goals and objectives were developed, the commonality of our expectations became increasingly evident, in spite of our often very different disciplines. Identifying core abilities as curricular themes was generally easy.

- As the content and approaches were merged, economies of "instruction" were identified, as multiple learning goals could be accomplished in interdisciplinary activities or projects.
- The inclination to divide up the course and have each work independently on sections to be re-combined was an early first instinctive response to the curriculum development.
- The importance of assessment became more clear, to not only know where students are beginning but also whether the goals have been achieved and the strategy effective.
- An emphasis on not only what a student must know but what they must be able to do to demonstrate their knowledge was difficult but important
- The extent of students' learning will be greater as parts relate to other parts - causing a student to have a more complete understanding
- Technology is an essential component in the development of a quality curriculum, but it presents its own challenges as faculty need to have increased computer literacy - with advanced word processing capabilities, presentation software, spreadsheets, databases, curriculum development software, and more.
- Appreciation for the depth, breadth, and value of the skills possessed by other faculty and the rigor and integrity of the disciplines was increased
- Collaboration takes much more time
- Discovery can be a powerful learning approach, but framing it within a course with an instructor as the resource and just-in-time instruction or tapping the power of the team's expertise requires entirely new instructional approaches
- Enthusiasm and energy rises among team participants
- Administrative details can create obstacles. Consideration must be given to credits, pre- and post-assessment, faculty load, and costs.

Future Opportunities and Directions

- Virtual courses, programs, and colleges are a likely part of our future. Responsiveness to student and community (including employer) requirements will necessitate a more flexible and timely development of curriculum. Benefits cited in "The Virtual Curriculum: Computer-Assisted Curriculum Development" by Thomas Leitzel and Dan Vogler include: (a) industry executives and faculty as design teams, (b) an instantly created product based on client needs, (c) reduced staff time in course development, (d) mutual dependency on subject matter exchange, and (e) improved college-industry relations. They cite The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century, by W.H. Davidow and M. S. Malone in defining "virtual" as a product that is available at any time, in any place, and in any variety.

  > *Davidow and Malone posit that building a virtual product requires an organization to revise itself, employ more sophisticated types of information, and master new organizational and production skills. Through revision, what emerges will have little in common with what previously existed.*

- Technology has the potential to increase the effectiveness and efficiency of curriculum development and delivery. Data bases, interactive distance education, information networks, and more can be maximized in the enhancement of education.

- National networks of educators and business representatives interested in integration should be established; preliminary informal ones already exist as a result of independent projects

across the nation, including this one. Building upon others' experience will expedite the process, which is known to be slow.

- Incorporation of work-based learning components into integration models will become more important as all students will have this experience from School-to-Work. The strategies for moving the learning from the classroom to the board room or tool room will be different still from those developed for multi-disciplinary courses.

- Alignment of these courses with high school curriculum, especially the model core curriculum and/or the state proficiency exams, will be an important articulation activity

- Statewide recognition of "Best Curriculum Development" should be created so that others know who is innovating and can learn from others' experience. There is a great need to celebrate successes and build on others' work.

- A Michigan Community College Curriculum Integration Guide should be produced. This is a natural sequel activity of the work of the original four teams.

- More research and publication concerning successful models and their approaches and outcomes must be conducted.

Next Steps

1. Publish curricula from existing projects in formats that could be adapted for use in other settings
2. Perform follow-up assessments of the students who participated in pilot courses
3. Continue the research into integrated curriculum - including visits to national community college sites which are more advanced in their development.
4. Continue the "dialogue" among the pilot projects for the professional development potential of continuing to share learning experiences
5. Utilize the existing teams to provide in-service education for future teaching and leadership teams
6. Continue funding of current-year projects to publish the curriculum, share the findings with many groups, and conduct evaluation studies
7. Launch a second project year with four-six additional community colleges
8. Convene a Dialogue group or association around this topic. Curriculum learning and discussion opportunities are now limited among community college faculty. Information networks can be a valuable vehicle in this development.
9. Coordinate the work of these teams with that of the Michigan Science Initiative
10. Institute state-wide task forces to explore transfer articulation issues with new instructional approaches

A Case for Integration

The proper balance between academic and job-specific preparation has been a topic of extensive debate for decades. Career education is midway between a liberal and a technical education. The different viewpoints are not likely to be reconciled easily or soon - particularly if the dichotomy of the two persists. As long as we consider the content to be either/or, there will be competition. Today's environment calls for an end of the competitive model and the nurturing of the

collaborative one. The question is not that of one versus the other; it's a question of how we can efficiently and effectively accomplish both to the highest possible level. There is much to suggest that integrating the contents will take us far toward achieving these goals.

Many factors contribute to the heightening interest in significant curricular reform. Nationally, high drop out and illiteracy rates in some districts have been major forces driving curriculum reform. Employers' criticisms of the schools regarding the preparedness of graduates have been escalating, especially as unemployment is lower and employers have had increasing difficulty in hiring qualified workers - often having to hire less qualified individuals. Vocational educators are criticized in some cases for providing overly specific training, while academic educators are criticized for providing instruction that neither is participatory nor connected to real-world requirements. Accountability expectations are increasing from many sectors: communities, employers, accrediting agencies, governments, and others. Students question our requirements, seeing little value to some of the requirements we have established. Many occupational programs have suffered declining enrollments in recent years.

High-skill workplaces, with flatter organizational structures, place greater responsibilities on each worker for thinking, problem solving, and communications. Individuals need to be better prepared for the high-skill workplace as well as to be productive as lifelong workers, regardless of the nature of the work, as jobs increasingly disappear and virtual corporations are more prevalent.

A 1995 statement from the Advisory Board of the National Center on the Educational Quality of the Workforce (EQW), "On Connecting School and Work," offers the following commentary:

> *Few American employers see schools as effective partners in their search for skilled workers. This growing disconnection between the nation's schools and its businesses threatens to undermine the educational quality of the workforce on which American productivity depends. The challenge is to develop initiatives that require neither new funds nor another government agency; rely on the market to create the incentives for firms to invest in human and physical capital; and lower the costs to employers of screening and hiring new workers.*

The 1990 amendments to the Carl Perkins Applied Technology Act require that federal money be spent on vocational programs that "integrate academic and vocational education . . . through coherent sequences of courses, so that students achieve both academic and occupational competencies.' (Section 235) The 1988 work of the Commission on the Future of the Community College recommended "exploring new ways to combine technical and general studies throughout the undergraduate experience," and that "community college faculty should take the lead in closing the gap between the so-called "liberal" and the "useful" arts, particularly by developing "up-to-date programs that integrate the core curriculum and technical education."

The calls for education reform at the postsecondary level have been loud, clear, and consistent. The response has been negligible. If the constituents we serve are not delighted with our product, and there appears to be little evidence that they are, then approaching our work differently must become a priority.

An interesting phenomenon is that most of the thrust is for integrating academic content into

occupational courses vs. the alternative, integration of career specialty instruction into academic courses. As School-to-Work programs gain momentum nationally, with their emphasis upon the need to provide ALL students with work-based experiences, changes should be anticipated. Occupational students all have required academic and/or general education requirements as a part of their programs of study, but transfer students do not typically have required occupational experience. If ALL students will be preparing for work, regardless of when they plan to enter their careers, then ALL students' programs of study should incorporate learning of both academic and occupational content.

Curriculum Integration and Tech Prep

Curriculum development associated with the Tech Prep statewide and national implementation has been more active at the K-12 level than in community colleges. Integration of academic and occupational learning is a tenet of the Tech Prep philosophy, which is designed to serve the majority of students who need to be better prepared for work and for continued education. Applied academic courses were a common response in K-12 as many Michigan schools moved to implement different systems.

Few examples exist of entirely new courses being developed at the post-secondary level, even though community colleges are major partners in the state's and their communities' efforts. Courses which existed before, such as Technical Math and Business Communications, continue to be offered - but little other integration curricular reform is underway. In fact, many colleges "dismissed" the need to develop new courses or approaches, taking a wait-and-see approach to whether students would really come out of schools with different and higher skill levels. The jury is still out on these outcomes, even though the research is now underway, but it is clear that the community colleges' "customers" have had enough different experiences in their K-12 education to expect a different learning environment at the college level. Integrating academic and occupational content is one important way to develop a different and effective learning environment.

A requirement in the Michigan project was that efforts be made with each pilot project to link its work to that of the local Tech Prep consortium. In some instances, funding for course development by the instructors came from the local consortium. The emergence of the School-to-Work movement is a natural extension of Tech Prep's school-based efforts as students will now be required to have meaningful work-based learning experiences as a part of their educational programs. A fundamental expectation is that the school-based learning will be connected to workplace requirements - an expectation that has not always been met by education.

One of the several Tech Prep books produced by Dale Parnell,, Dan Hull, and others through CORD was originally called LogoLearning. (In a later printing the book had a new title.) These authors argue that we must turn the system right-side-up by making teaching and curriculum the variables and results the constant. Their right-side up principles follow:

1. Purpose Directs the Organization
2. Real-life Problems Take Precedence Over Subject-Matter Isolation
3. Students Gain Understanding Through Problem Solving
4. Academic and Vocational Concerns Are Integrated Whenever Possible into an Applied-Learning Process
5. Competence is the Constant; Time the Variable

LogoLearning is not an either/or education. Instead, it is an integrated approach that provides a bridge between:

- purpose *and* outcome
- head *and* hand
- academic *and* vocational
- knowing *and* doing
- theory *and* practice
- time *and* competence
- education *and* training

Directory

State Project Coordinators

Dr. James Jacobs
Associate Vice President for Business
and Community Services
14500 Twelve Mile Road
Macomb Community College
Warren, MI 48093-3896

telephone: (810) 286-2119
fax: (810) 286-2047
e-mail: jjacobs@macomb.cc.mi.us

Ms. Roberta C. Teahen
Director of Business and Workforce Development
Northwestern Michigan College
1701 East Front Street
Traverse City, MI 49686

telephone: (616) 922-1151
fax: (616) 922-1546
e-mail: rteahen@nmc.edu

Michigan Department of Education Project Managers:
Mailing Address:
Higher Education Management Services
P. O. Box 30008
Michigan Department of Education
Lansing, MI 48909

Mr. James Folkening
telephone (517) 373-3360
fax: (517) 373-2759
e-mail: folkenj@state.mi.us

Ms. Patti Loncharich
telephone (517) 373-0273
fax: (517) 373-2759
e-mail: lonchap@state.mi.us

Delta College
College Mailing Address:
University Center, MI 48710

Primary Contact Person:
Dr. Betty Jones
Telephone: (517) 686-9298
fax: (517) 667-0620
e-mail: betty_jones@delta.edu

Secondary Contact Person:
Mr. John Flattery
Telephone: (517) 686-9291

e-mail: john_flattery@delta.edu

Team Members:

Dorothy Balish-Eldridge, Nursing
Telephone: (517) 686-9384 fax: (517) 686-8736

Mary Beth Looby, English
Telephone: (517) 686-9167 fax: (517) 686-8736

Linda Plackowski, Philosophy
Telephone: (517) 686-9370 fax: (517)686-8736

Henry Ford Community College
College Mailing Address:
5101 Evergreen Road
Dearborn, MI 48128-1495

Primary Contacts: Dr. Jo-Ann Terry, Dean of Career Education
Telephone: (313) 845-9607 Fax: (313) 845-9800
E-mail: Jo-Ann@mail.henryford.cc.mi.us

and

Dr. Paul Batty, Dean of Liberal Arts
Telephone: (313) 845-9605 Fax: (313) 845-6427
E-mail: PBatty@mail.henryford.cc.mi.us

Team Members:

Richard Bailey, English
Telephone: (313) 845-6498 fax: (313) 845-9778
e-mail: rbailey@mail.henryford.cc.mi.us

Stanley Briggs, Physics and Electronics
Telephone: (313) 85-6333 fax: (313) 845-9872
e-mail: stanb@mail.henryford.cc.mi.us

Gail Conte, Corporate Training
Telephone: (313) 845-9652 fax: (313) 845-9654
e-mail: gail@mail.henryford.cc.mi.us

Mike Daher, English
Telephone: (313) 845-6457
e-mail: MDaher@mail.henryford.cc.mi.us

Robert Eschelman, Physics
Telephone: (313) 845-6311 fax: (313) 845-6334
e-mail: eshelman@mail.henryford.cc.mi.us

Rosemary Pepper, Tech Prep
Telephone: (313) 730-6361
e-mail: Rpepper@mail.henryford.cc.mi.us

Macomb Community College
College Mailing Address:
14500 Twelve Mile Road
Warren, MI 48093-3896

Primary Contact Person: Dr. James Jacobs; see information above.

Team Members:

Les Beecher
Telephone: (810) 445-7138 fax: (810) 445-7238 e-mail: beecher@macomb.cc.mi.us

Brian Hamilton, Technology
Telephone: (810) 4445-7149 fax: (810) 445-7345 e-mail: hamilton@macomb.cc.mi.us

Fred Jex, Accounting
Telephone (810) 445-7155 fax (810) 445-7014 e-mail: jex@macomb.cc.mi.us

Kelly Kruger, Information Management
Telephone: (810) 445-7167 fax: (810) 445-7014 e-mail: kkruger@macomb.cc.mi.us

Dave Pilon, Technology
Telephone (810) 445-7411 fax: (810) 445-7130 e-mail: oukib@macomb.cc.mi.us

Ruth Reed, English
Telephone: (810) 445-7210 fax: (810) 445-7238 e-mail: reed@macomb.cc.mi.us

Northwestern Michigan College
College Mailing Address:
1701 East Front Street
Traverse City, MI 49686

Primary Contact Person: Roberta C. Teahen; see information above.

Team Members:

Stephen Drake, Mathematics;
Telephone: 616-922-1266 fax : 616-922-8980 e-mail: sdrake@nmc.edu

Jill Hinds, Visual Communications/Humanities
Telephone: 616-922-1328 fax: 616-922-1696 e-mail: jhinds@nmc.edu

John Pahl, Communications
Telephone: 616-922-1187 fax: 616-922-8986 e-mail: jpahl@nmc.edu

John Pflughoeft, Mathematics and Engineering
Telephone: 616-922-1269 fax: 616-922-8980 e-mail: jpflughoeft@nmc.edu

Stan Sidor, Industry Training
Telephone: 616-922-1723 fax: 616-922-1722 e-mail: ssidor@nmc.edu